BEAKED WHALES—*HYPEROODON PLANIFRONS* AND *MESOPLODON LAYARDII*—FROM SOUTH AUSTRALIA

By HERBERT M. HALE, Curator, South Australian Museum.

Figs. 1-27.

Hyperoodon planifrons Flower.

Hyperoodon planifrons Flower, Proc. Zool. Soc., 1882, p. 392, figs. 1 and 2; Moreno, Anales Mus. de La Plata, Secc. Zool., iii, 1895, pp. 4-8, pl. i, figs. 2 and 3 and pl. ii., figs. 3 and 4.

Early in December 1929, it was reported that a whale was stranded near Port Victoria, on Yorke Peninsula. On request, Mr. A. D. Edwardes, of Port Victoria, furnished a description, which showed clearly that the specimen was a large Bottlenose, with a single pair of teeth at the extreme end of the mandible. The whale had been stranded thirteen miles south of Port Victoria, and was alive when first noticed. It was then upon a sandbank 100 yards or so below high tide mark. During its struggles the animal had excavated a considerable hollow in the sand, and in this depression it died on November 22. None of the numerous visitors heard any sound from the dying creature, that is, no evidence of a voice. The life-colour was described as being bluish-black above with the belly creamy or grey.

In a few days a high tide carried the whale on to seaweed well above the level of the aforementioned spit. On December 10 the writer, in company with the Taxidermist (Mr. J. Rau) and his assistant (Mr. A. Rau), visited the locality in order to secure the skeleton for the Museum. The whale, an adult male, was then lying on its left side, and was partly buried in weed; oil was running freely from the hide. Visitors had removed the tip of the dorsal fin, and also portion of one of the tail-flukes. The body was somewhat inflated, but some flesh-measurements were taken, and a sketch, to scale, was made (fig. 2). It will be noted that the forehead is massive and slopes forward, so that it overhangs the base of the beak. The dental sockets, from which the teeth had been removed by Mr. Edwardes, were entirely fibrous, and showed where the adhering tissue had been cut; they were barely an inch apart, and were situated at the extreme end of the lower jaw. The gums were removed *in toto*, but evidences of no other teeth were apparent. The blow-hole was placed in the mid-line of the head, and slightly in advance of the vertical of the eye, which was 57 mm. in length and

25 mm. in depth. A single pair of throat grooves, each 405 mm. in length, were present; their posterior ends were 280 mm. apart. The penis was extended and prominent.

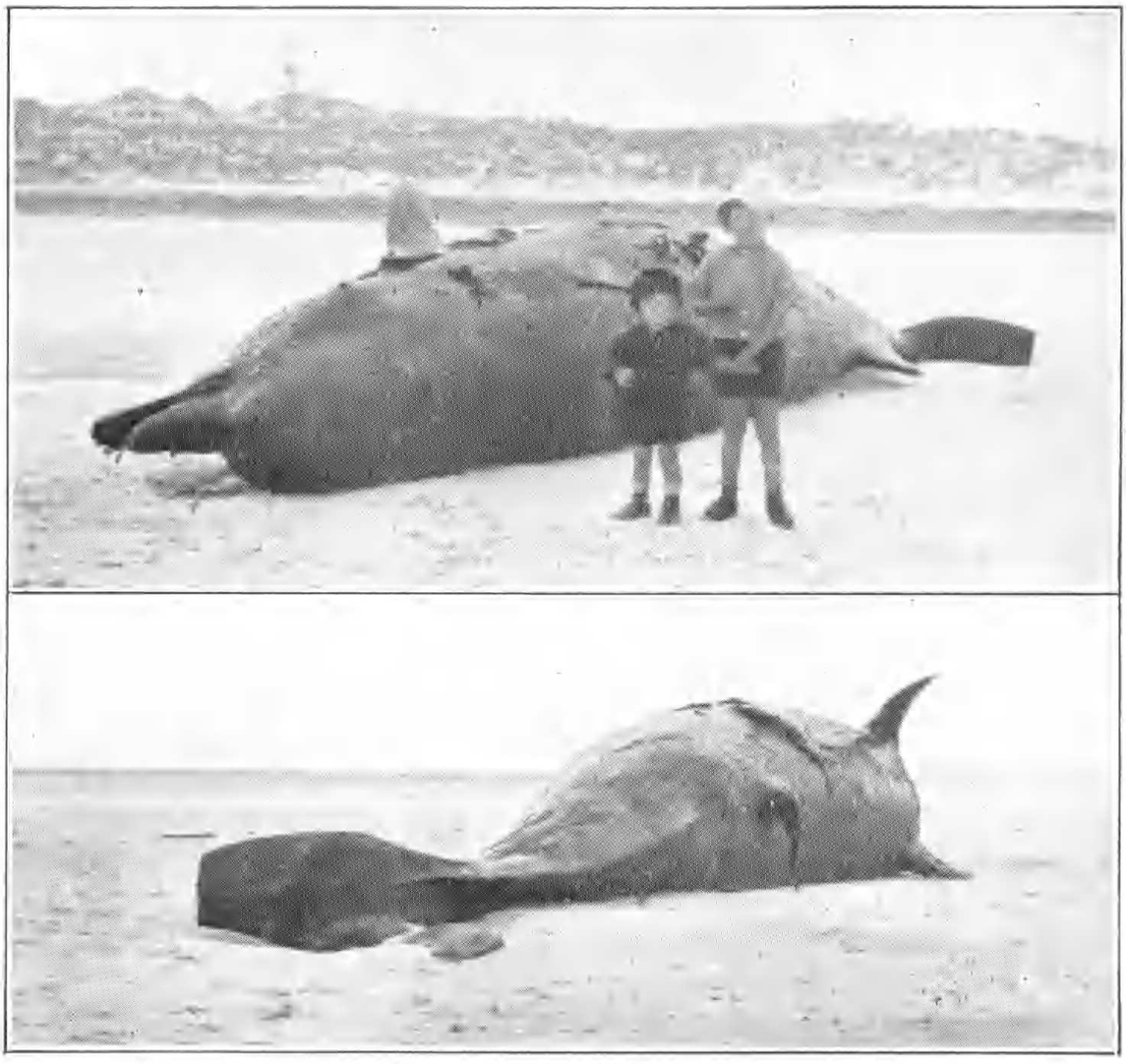


Fig. 1. *Hyperoodon planifrons* on sandbank at Pt. Victoria. (Photos, M. Newbold.)

The stomach contained a large quantity of Cephalopod beaks, regarding which Mr. B. C. Cotton (Assistant Conchologist at this Museum), reports: "The large size of these beaks indicates that they are from Cephalopoda of considerable bulk. Our common *Sepia apama* has the beak smaller and of different shape. The only other member of our known Cephalopod fauna which could have beaks of this size is *Polypus variolatus*, of which we have a specimen 1,180 mm. in length."

Fig. 2. *Hyperoodon planifrons*, Pt. Victoria.

Local fishermen stated that a school of about twenty-five whales was observed in Spencer Gulf immediately prior to the casting up of this specimen, and that they considered it to be one of this school. The Blackfish *(Globiocephala melaena)* has been seen in herds in both Spencer and St Vincent Gulfs, but as *Hyperoodon ampullatus* is said to be gregarious the evidence is given for what it may be worth.

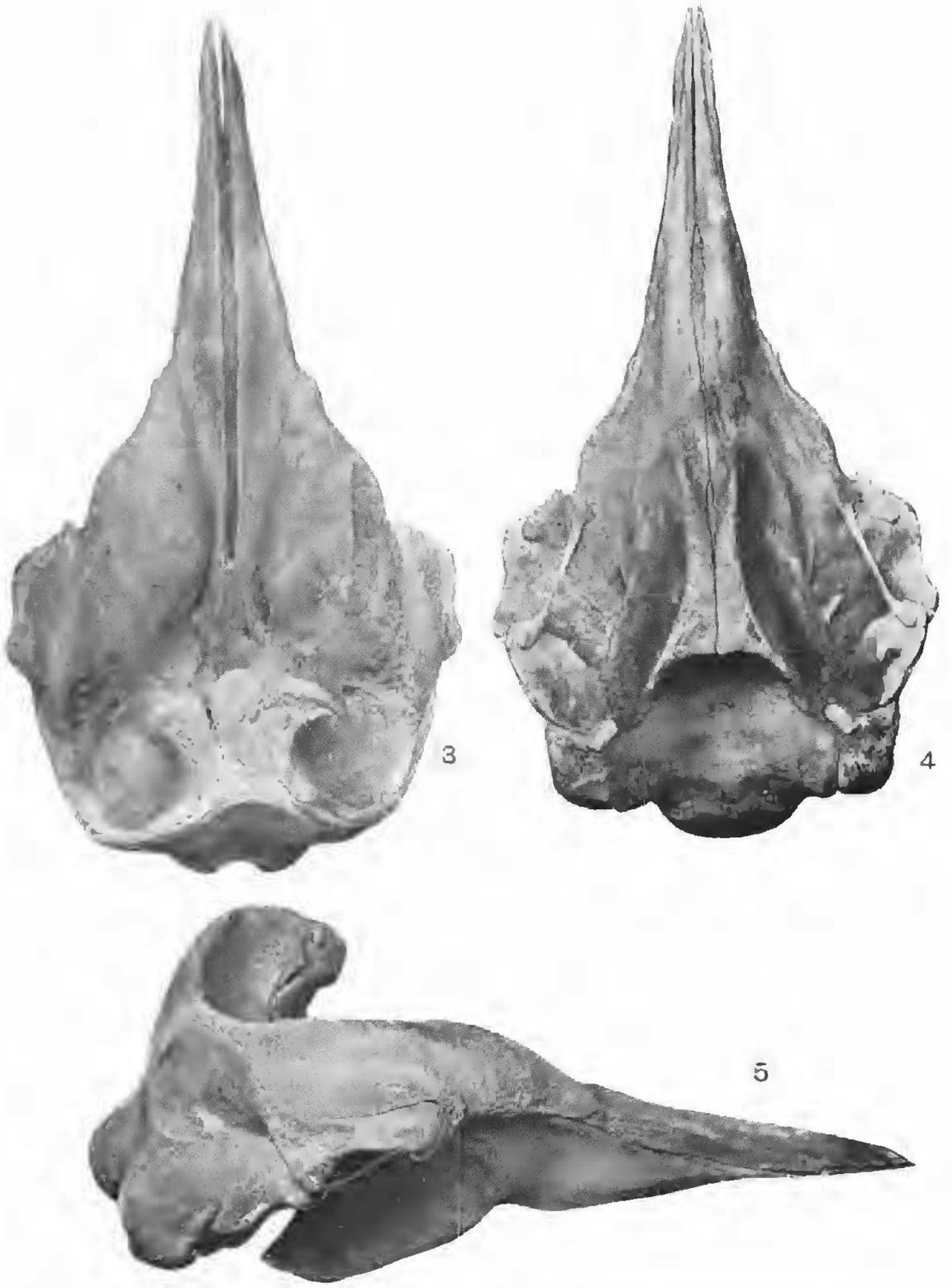
The writer is extremely indebted to Mr. A. D. Edwardes for help in obtaining a satisfactory preliminary description of this whale; also to Mr. H. E. A. Edwardes, who rendered considerable assistance with transport. Mr. J. Rau and his assistant (Mr. A. Rau) spared no pains in order to ensure that the complete skeleton might be secured, and are to be congratulated upon the enthusiastic manner in which they undertook an unpleasant task, the whale having been dead for nineteen days when the "fleshing" was commenced. Mr. B. Cotton is responsible for the photographs of the skeleton, and Mr. H. Condon assisted in the preparation of the drawing reproduced in fig. 2.

External Dimensions.

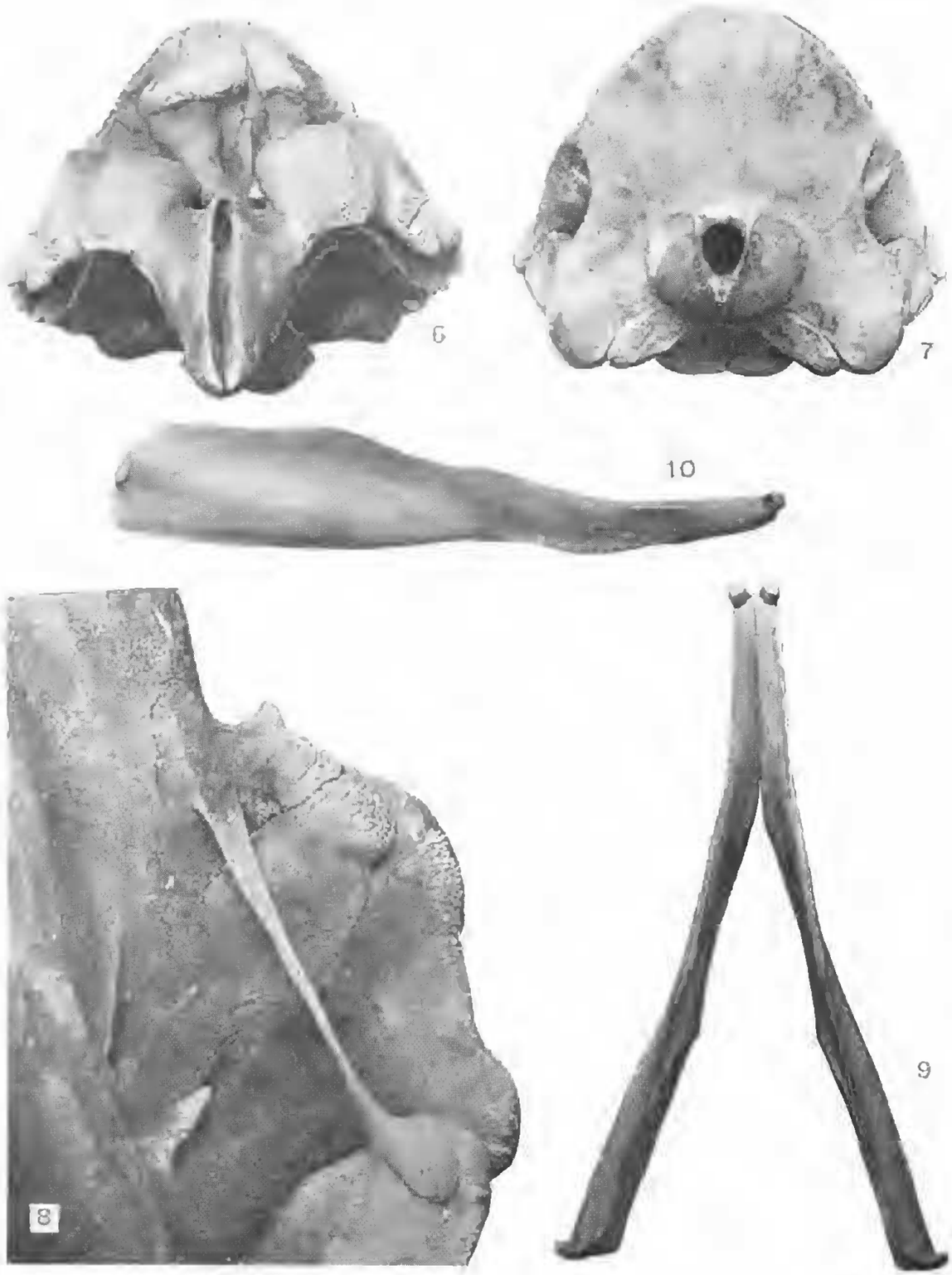
	mm.	ft.	in.
Total length to middle of tail-flukes - -	6935	22	9
Tip of beak to eye - - - - - -	1067	3	6
Tip of beak to vent - - - - - -	4800	15	9
Tip of beak to penis - - - - -	4192	13	9
Tip of beak to origin of dorsal fin - - -	4673	15	4
Tip of beak to axilla - - - - -	1830	6	0
Length of gape - - - - - -	458	1	6
Length of pectoral fin - - - - -	813	2	8
Breadth of flukes (approx.) - - - -	2035	6	8

Skull.

Sutures, particularly on dorsum, more or less anchylosed. Apex of rostrum acute, deeper than wide opposite distal ends of maxillae. Premaxillae not widely separated, strongly over-arching mesorostral gutter excepting at extreme distal end; with sharp edges, parallel above groove to level of premaxillary foramina, where the right premaxilla twists to the left; expanded distal parts smooth anteriorly and rugose dorsally; the right is particularly massive, with the anterior face nearly twice as wide as that of the left. Groove between nasals deep but narrow; inner anterior edge of each nasal (at bottom of groove) drawn up into a low, thin flange. The vomer appears in floor of mesorostral groove 380 mm. from tip of rostrum, and passing back soon occupies whole concave floor of the groove and the greater part of its sides; no median elevation and no mesirostral ossification; an elongated section of the vomer is visible on the inferior surface of the beak, 375 mm. from the tip, and a tiny section appears between the palatines and



Figs. 3–5. Dorsal, ventral, and lateral views of skull of *Hyperoodon planifrons*.



Figs. 6-10. *Hyperoodon planifrons*: 6-7, anterior and posterior views of skull; 8, orbital region; 9-10, mandible.

pterygoids. Mesethmoid extending forward nearly to level of antorbital notches, where it fills the mesorostral groove and is nearly covered by the premaxillae; at about level of maxillary foramina the mesethmoid exhibits a crest, sharply bent to the left, and lying against the left premaxilla; this crest is thickened at the anterior border of the nares, then is continued as the sharp-edged nasal septum, sweeping, with strongly convex margin, ventrally, then dorsally with slightly concave margin. The mesethmoid generously overlaps the nasals, but the septum does not nearly meet the low internasal crests. Maxillary foramina a little in advance of premaxillary foramina. Maxillary tuberosities much wider than deep, rounded, and slightly inverted in region of maxillary foramina, which they partly overhang; right tuberosity with a low, dorsal, longitudinal carina, which sweeps forwards and downwards, but vanishes at about the level of the antorbital notch; left with a similar but obsolete carina. Outer border of orbit concave in dorsal or ventral view. Antorbital tubercle large, and antorbital notch deep. Antorbital tubercle and ventro-lateral faces of malar and lachrymal rough and irregular (fig. 8).

Mandible and Teeth.

The rami of the mandible are anchylosed together at the symphysis: the groove between, dorsally and ventrally, is crossed by ossified bridges, suggesting that fusion was still proceeding (figs. 9–10).

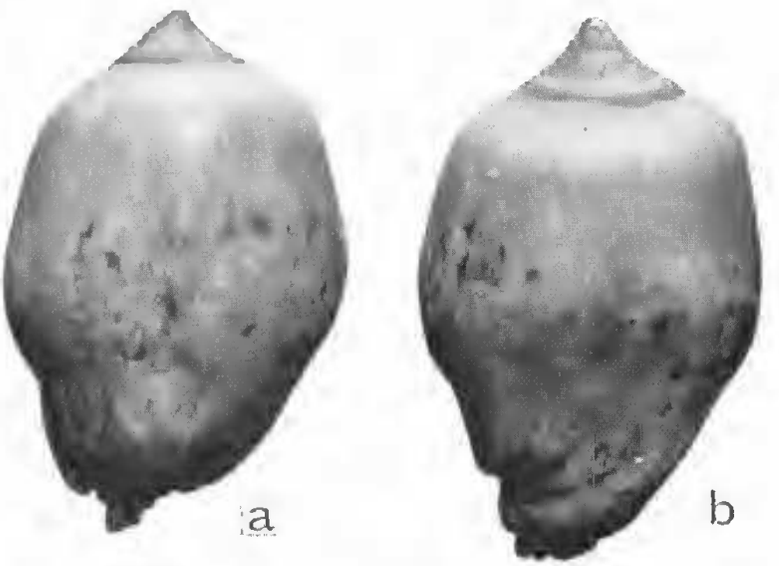


Fig. 11. Teeth of *Hyperoodon planifrons* (a, left; b, right); nat. size.

The teeth were sent to the Museum before the writer examined the whale. Mr. Edwardes wrote that they were "at the extreme end of the mandible, sloping forwards, and about one inch apart. They were rather mobile, and I had little

difficulty in extracting them with a penknife." They are subconical in shape, with the roots entirely closed (fig. 11). Including the apical denticle, they projected only about 20 mm. above the gum. Their dimensions are:

	Left.	Right.
Length	57 mm.	59 mm.
Greatest diameter	36 mm.	37 mm.

Dimensions of Skull.

	mm.
Total length	1391
Height from vertex to inferior border of pterygoids	666
Tip of rostrum to level of antorbital notches	857
Tip of rostrum to posterior free border of pterygoids	1141–1150
Tip of rostrum to anterior end of nasals	1065
Breadth of rostrum at antorbital notches	500
Breadth of rostrum in front of maxillary tuberosities	210
Greatest depth of rostrum	227
Breadth of premaxillae in front of nares	295
Breadth of base of maxillary tuberosity (at antorbital notch)	200–204
Depth of maxilla (antorbital tubercle to dorsal margin)	175
Height of supraoccipital (dorsal edge of foramen magnum to top of occipital crest)	410
Dorsal narrowest width of supraoccipital, between hinder margins of temporal fossae	85
Width of foramen magnum	60
Width of condyles	237
Height of condyles	174
Length of tympanic bulla	52
Breadth of tympanic bulla	42
Length of mandible	1184
Length of symphysis	392
Depth of mandible at coronoid	218

Vertebrae, Ribs, etc.

The number of vertebrae is: Cervical, 7; thoracic, 9; lumbar, 10; caudal, 20 = total 46. All seven cervicals are fused together. The neural spines from the second thoracic to the seventh caudal lean back well beyond the level of the posterior margins of their respective centra. The spines of the second to ninth thoracics have been damaged during life, and the fifth to ninth in particular

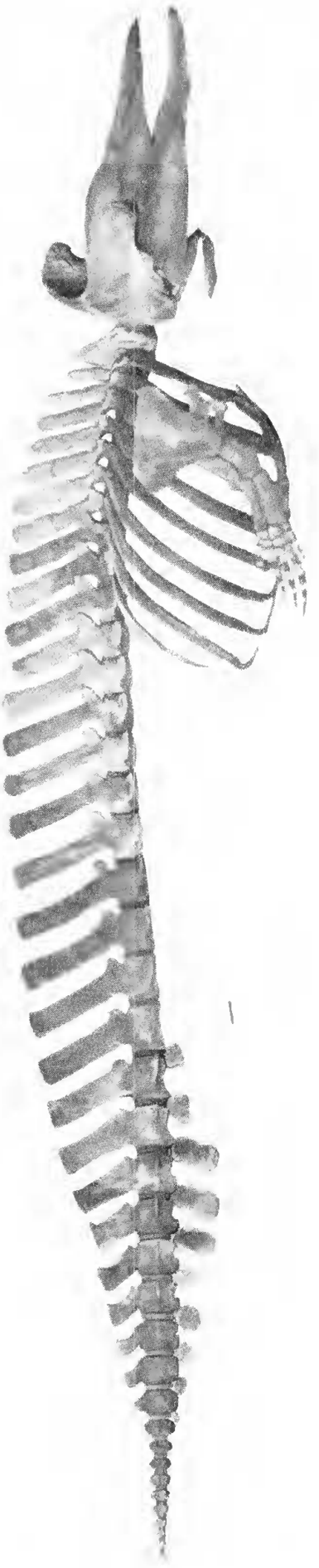


Fig. 12. Skeleton of *Hyperoodon planifrons*.

exhibit considerable callosity where the bone has been broken across. All of the lumbars have been similarly broken, the eighth to tenth immediately above the neural arch. The tip of the spine of the fifth caudal has been damaged, apparently by a heavy blow from above.

There are nine ribs, seven of which are double-headed. The sternum is of three pieces. The articular facet for the eighth rib is at the end of two fused processes from centrum of eighth thoracic.

Cervical Vertebrae.

All anchylosed, the conjoined neural arches and spines sloping backwards and forming a pyramidal mass (figs. 13-15). Foramina above anterior articular facets of atlas complete; edges of facets raised; inferior lateral processes strong, bent slightly downwards and backwards, and fused with similar process of second

Figs. 13-15. Anterior, lateral, and posterior views of cervical vertebrae of *Hyperoodon planifrons*.

cervical, there being a complete foramen between on each side. Second cervical with a short, rugose, superior lateral process; an incomplete foramen on right and complete foramen on left, between it and inferior lateral process. Third with a short superior lateral process, that on left anchylosed with process of preceding cervical (leaving a complete foramen), that on right side free. Fourth to sixth cervicals with rudimentary superior lateral processes. Seventh with greater part of right side of neural arch free, including apex, which does not meet the opposite member of the arch; lateral process practically non-existent; a thick articular facet for head of first rib has its upper margin at middle of side of centrum.

Thoracic Vertebrae.

First: Neural spine nearly vertical, pointed, shorter than centrum and arch together. Process with facet for tubercle of first rib on side of neural arch, directed downwards and forwards. Facet for second rib on middle of side of centrum, near posterior edge.

Seventh: Metapophyses short and stout, widely separated, and with a broad, rugose articular process and facet (for tuberculum of seventh rib) projecting outwards and downwards. No facet on centrum and lateral process represented by a low boss on each side. Neural spine of approximately equal width throughout (widest at middle of length owing to injury), truncate at tip, and higher than any of preceding spines.

Eighth: Metapophyses rather thin, subtriangular. Articular process for rib directed outward and slightly backward, fusing with a transverse process from side of centrum, leaving a large foramen between on each side; articular facet large, elliptical, and rugose.

Ninth: Metapophyses subtriangular, with upper margin almost straight. Transverse process wide, a little longer than centrum, narrowed at base, but with the proximal anterior corner produced forwards; anterior edge sinuous, posterior oblique; articular facet not distingishable, the "tubercle" area of the eighth rib articulated along oblique distal margin, and ninth rib articulated at postero-lateral corner. Neural spine three and one-half times as long as wide.

Lumbar Vertebrae.

The neural spines are subequal in length, each a little longer than in last thoracic; they are widest near the tip (those of the eighth and ninth are equally as wide at base owing to healed fractures). The metapophyses in all are similar to those of last thoracic. Each centra presents an inferior median ridge, longitudinally convex in the first to seventh lumbars and longitudinally concave and less marked in the eighth to tenth.

First: Similar to last thoracic, but with transverse process directed rather more forward and with proximal anterior angle less produced.

Tenth (last lumbar): Centrum as long as that of first caudal and longer than that of any preceding vertebra. Neural arch and spine together two and one-fourth times length of centrum; apex of spine more truncate than in other lumbars. Transverse process one-half as long as centrum, curving forward so that anterior distal angle is almost in line with anterior face of centrum. Metapophyses closer to each other than in preceding vertebrae.

Caudal Vertebrae.

First (27th vertebra): Similar to last lumbar, but neural spine with apex more truncate and with anterior and posterior margins straighter and therefore more nearly parallel. Metapophyses and transverse processes similar. Centrum slightly flattened inferiorly, with merest indications posteriorly of facets for chevrons.

Second: Similar to first, but with transverse process only two-thirds as long. Centrum slightly longitudinally concave inferiorly, with a pair of slight facets anteriorly and two small but distinct processes with facets posteriorly.

Third: Similar to second, but both posterior and anterior inferior processes for chevrons are larger, although the front ones are still small. On each side of centrum a low oblique ridge runs up and back from junction of anterior margin of transverse process.

Fourth to sixth: The centra on each side have a slightly oblique ridge, immediately below the neural arch.

Seventh: Depth of centrum (exclusive of inferior processes) greater than length and equal to length of neural arch and spine together. Metapophyses scarcely projecting anteriorly; a strong rugose ridge running backwards from their origin on each side across two-thirds of base of spine. A less pronounced longitudinal ridge on each side at base of neural arch. Transverse process represented by a strong ridge, highest anteriorly, perforated by a complete foramen on left side and an incomplete on right. Chevron processes large. Median inferior surface of centrum slightly concave.

Eighth: Similar to seventh, but neural spines shorter, and transverse process represented by slight lateral thickening anteriorly. Anterior and posterior chevron processes almost meeting on each side, thus enclosing a deep inferior groove.

Ninth: Chevron processes represented by two inferior ridges, each perforated in middle of length, and with articular facets fore and aft.

Eleventh: Centrum much deeper than long, grooved below, and with a pair of inferior foramina. Neural arch and spine represented by a low boss, on each side of which are indefinite rounded projections (metapophyses). A dorsal foramen on each side of centrum.

Twelfth to fifteenth: Grooved inferiorly, and with one or two inferior foramina and a pair of dorsal foramina. Thirteenth to fifteenth subquadrangular in shape. Low humps and ridges indicate obsolete neural arches and lateral processes.

Eighteenth to twentieth: Rugose, subconical; foramina obliterated.

Chevrons.

Ten in number, the members of each pair united; fig. 16 shows the respective shapes and sizes. Number four is 230 mm. in depth, and its greatest length is 152 mm.

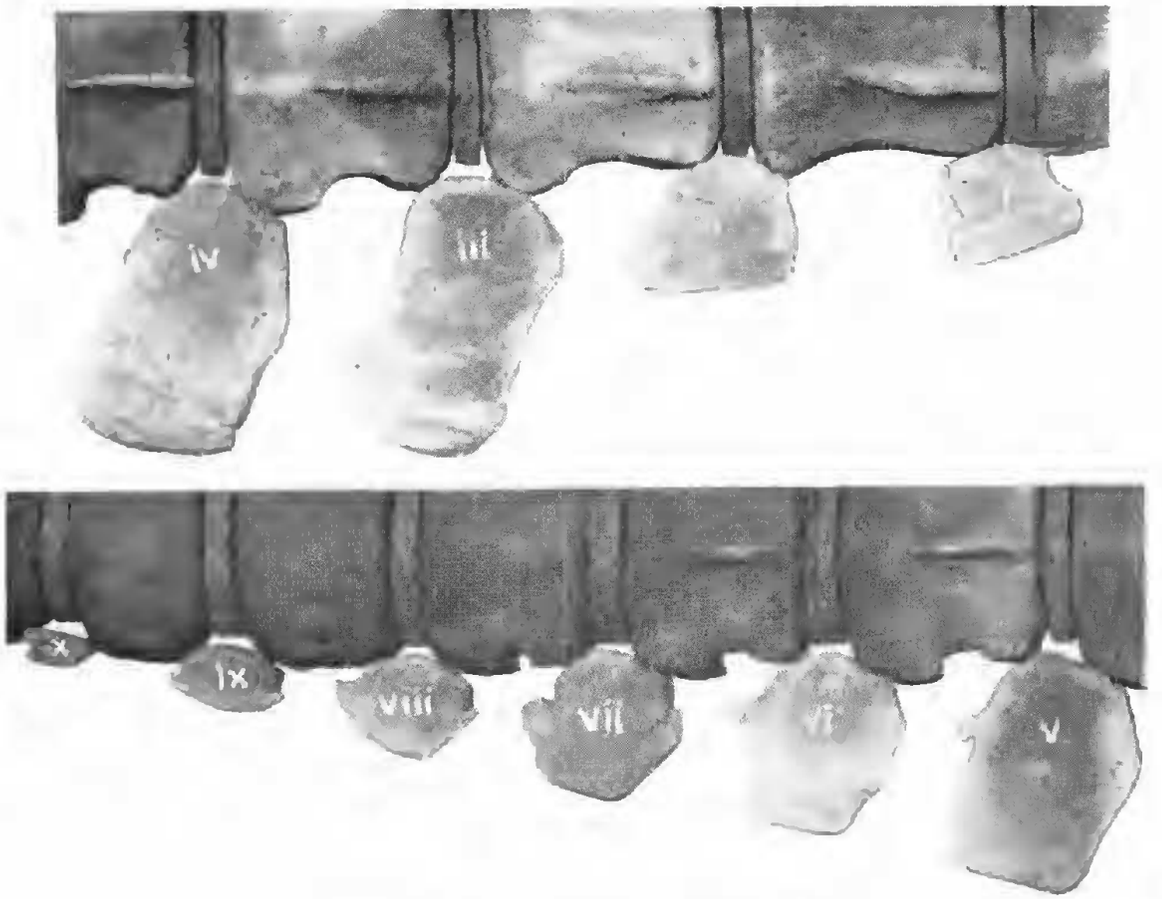


Fig. 16. Chevron bones of *Hyperoodon planifrons*.

Ribs.

First rib much shorter than any of the others, excepting the ninth, and much wider, the breadth being almost one-third the length; broadest at proximal end; head and tubercle wide, situated close together. Succeeding ribs decrease in breadth and increase in length to the sixth. Seventh about same breadth as sixth, but a little shorter. Eighth about 30 cm. shorter. Ninth ribs much more slender than any of the preceding; asymmetrical, the left little more than half as long as the right, which is longer than the first rib.

The capitulum and tuberculum of the first rib are separated by a gap of 20 mm.; in the third, fourth, and fifth ribs this distance becomes successively greater, but in the sixth is slightly reduced. The tubercle of the seventh rib is only moderately developed, and the eighth and ninth have no tubercle, although

the eighth is rugose on the area by which it is articulated to the oblique margin of the transverse process of the ninth thoracic. The head of the eighth bears a large facet, but the ninth has no definite facet.

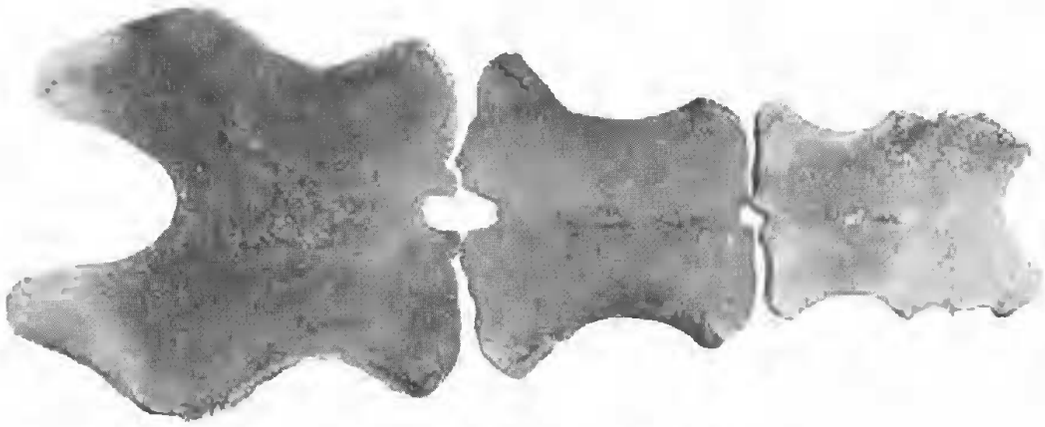


Fig. 17. Sternum of *Hypercoudon planifrons*.

Sternum.

Three pieces. Manubrium (including in length anterior projections) a little longer than wide, rugose and convex inferiorly, smoother and concave on inner face. A deep anterior notch and a relatively very small posterior notch. Lateral edges concave. Facets for cartilaginous sternal ribs thick and prominent.

Fig. 18. Right scapula of *Hypercoudon planifrons*.

Second segment widest anteriorly, where the breadth slightly exceeds the length. Anterior notch equal in size to posterior notch of manubrium; posterior notch much smaller. A longitudinal median, rugose, inferior ridge.

Third segment bears facets for cartilage of fourth and fifth ribs and in part (antero-lateral angles) for third ribs. Anterior margin with very small notch; posterior notch wide and shallow.

Scapula.

Ridges distinct. Anterior margin nearly straight, posterior border slightly concave and superior irregular. Anterior angle broadly rounded, posterior angle more acutely rounded. Acromion bent upwards and inwards, narrower across rounded tip than at base, constricted at distal third, so that superior border is concave and inferior sinuous. Coracoid shorter than acromion, considerably expanded, and rugose at tip.

Fore-limb.

Left flipper slightly damaged by post-mortem abrasion.

Head of humerus oblique, overhanging shaft on ulna side; distal end not expanded; deltoid ridge irregular and rugose. Radius slightly widened at distal end, almost straight. Ulna slender, half as broad as radius, suboval in section;

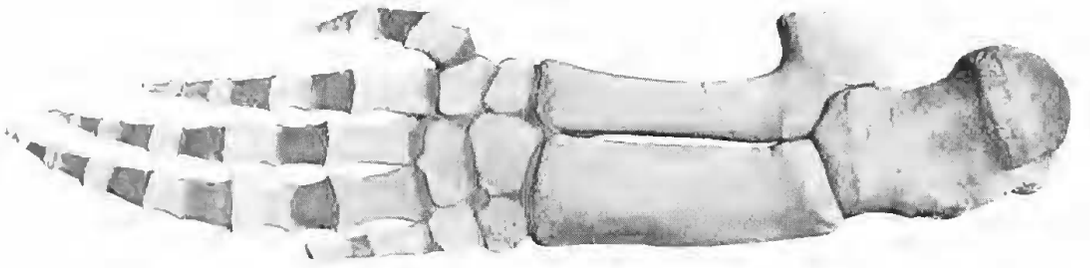


Fig. 19. External surface of bones of right fore limb of *Hyperoodon planifrons*.

olecranon prominent, thin, and pointed. Six carpals, two on ulna side in line with metacarpal iv, two in middle and two on radial side in line with metacarpal i. Phalanges (including metacarpals):

Right: i, 2; ii, 7; iii, 6; iv, 5; v, 3.

Left (incomplete): i, 2; ii, 5; iii, 4; iv, 4; v, 3.

The terminal phalanges of ii to v are minute.

Pelvic Bones.

Slender, simple, each approximately 110 mm. in length. They were situated 4,500 mm. posterior to the tip of the mandible, below the last lumbar.

Loc. Thirteen miles south of Port Victoria, western coast of Yorke Peninsula, South Australia. (Complete skeleton in South Australian Museum, Reg. No., M. 2852.)

MESOPLODON LAYARDII Gray.

Ziphius layardii Gray, Proc. Zool. Soc., 1865, p. 358.

Mesoplodon layardii Oliver, Proc. Zool. Soc., 1922, p. 574 (syn. and ref.); Waite, Rec. S. Aust. Mus., ii, 1922, p. 209, pl. ii and iii; Scott and Lord, Proc. Roy. Soc., Tasmania (1926), 1927, p. 87.

In 1922 Waite *(ut supra)* recorded this species from South Australia, a single young male (the skeleton of which was secured for the Museum), having been stranded at Kingston. Three further examples have since been cast up on our shores, one at Port Victoria and two near Victor Harbour.

PORT VICTORIA SPECIMEN.

A few days after the skeleton of *Hyperoodon planifrons*, described above, had been secured, Mr. A. D. Edwardes wrote that another, but different, Beaked Whale had been stranded close to the same spot—a remarkable coincidence. It was much decomposed, and was reduced to "about 12 feet in length." It proved to be a Strap-toothed Whale, with the teeth unerupted, and Mr. Edwardes kindly secured and cleaned the skull for the Museum. The sex was not noted.

Skull.

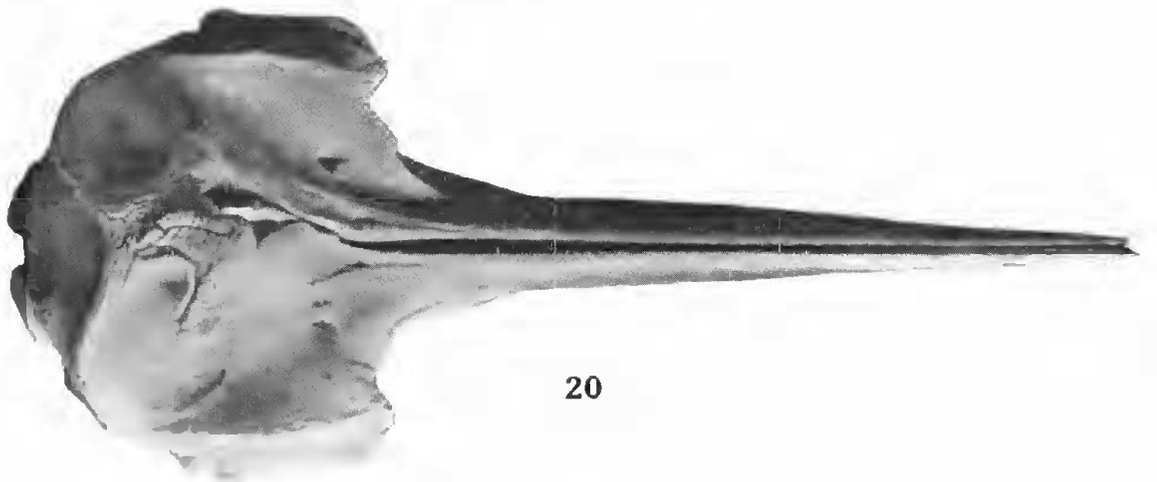
Very similar to that of the Kingston example described by Waite. The vomer appears in the mesorostral groove 160 mm. from tip of rostrum, and is evident ventrally at this point also, the inferior visible portion fusiform, 180 mm. in length; a tiny section appears also between the palatines and pterygoids. The premaxillary foramina are almost in line, and are in advance of the maxillary foramina.

Mandible with rami separate. Teeth with denticle projecting outwards but not downwards or upwards (fig. 24). Dimensions of teeth:

	Right.	Left.
Length of base - - -	73 mm.	72 mm.
Greatest depth - - -	30	30
Greatest width - - -	8·5	8

The dimensions of this skull and of that of one of the Victor Harbour specimens are given below.

Loc. Thirteen miles south of Port Victoria, western coast of Yorke Peninsula, South Australia. (Skull in South Australian Museum, Reg. No. M. 2853.)



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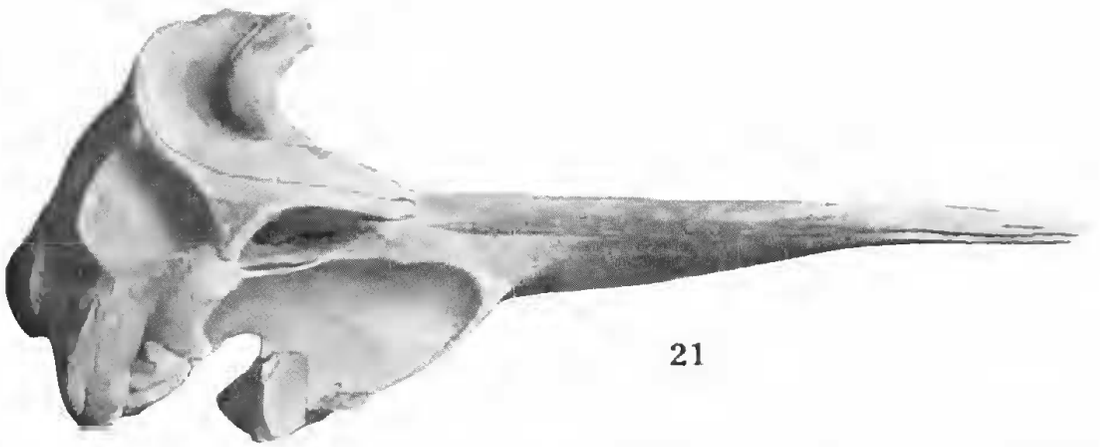

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Figs. 20-21. *Mesoplodon layardii*: dorsal and lateral views of skull of example from Pt. Victoria.

VICTOR HARBOUR SPECIMENS.

On or about February 3, 1931, two small whales, which were previously noted sporting inshore, were cast up between Victor Harbour and Port Elliot, in Encounter Bay (figs. 22-23). These were examined by Mrs. L. C. Simpson, who measured the total length of each and made sketches. One example, a male, was 15 feet in length; the other, more bulky, a female, 17 feet in length. Mrs. Simpson stated that she could find no teeth in either, the gums being "quite smooth." The colour of both was black above and white below.

On receiving this report we visited the locality (February 6), and found that the female had been carried out by a high tide and washed in again nearer to Port Elliot. The beak and mandible were missing, and the cranium was badly smashed.

The male had been thrown up near the township of Victor Harbour, and had

Fig. 22. Ventral view of *Mesoplodon layardii* (male, 15 ft. in length) on beach at Victor Harbour (Photo, A. S. Sladden).

been cut up and buried by council employees. The head was disinterred, and the Museum Taxidermists secured the skull.

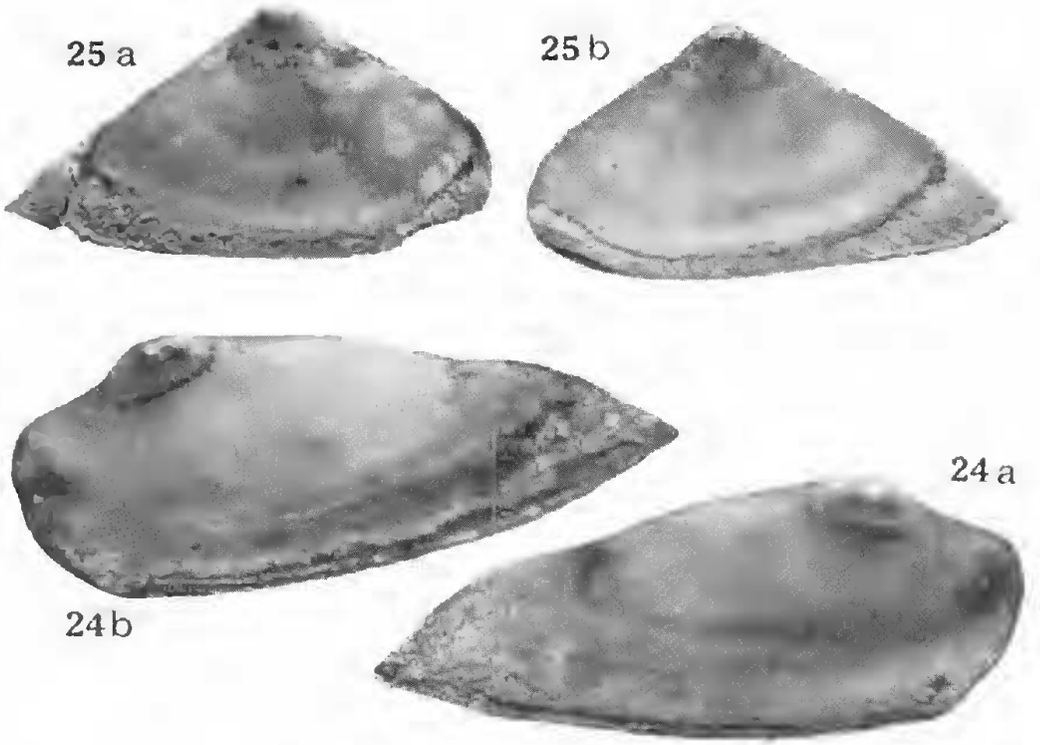
The ventral view of the male (fig. 22), taken soon after stranding, shows the creature partially buried in sand by the receding tide, but the single pair of throat grooves is apparent.

Fig. 23. Dorso-lateral view of *Mesoplodon layardii* (female, 17 ft. in length), on beach near Pt. Elliot (Photo, A. S. Sladden).

Skull of Male.

Younger than the preceding. A little less of the mesethmoid is ossified and the temporal fossa is wider. The right premaxilla, in front of the nares, is not twisted to the left quite so much. The beak is shorter but distinctly wider, and

the area of the external faces of the palatines is greater (*cf.* figs. 21 and 27). The mesorostral gutter (as in other immature examples) is empty when the cartilage is removed by maceration: the vomer appears in the groove, and also inferiorly, 140 mm. from the tip of the beak; ventral visible part 200 mm. in length; a small portion appears between palatines and pterygoids also. The premaxillary foramina are in line and are on a level with the maxillary foramina. Each pterygoid exhibits three areas, near the inferior margin, occupied by very thin cellular bone, evidently sites of former foramina. Basi, thyro, and stylohyals not fused.



Figs. 24-25. Teeth of *Mesoplodon layardii* (a, left; b, right); 24, of example from Pt. Victoria; 25, of male from Victor Harbour (nat. size).

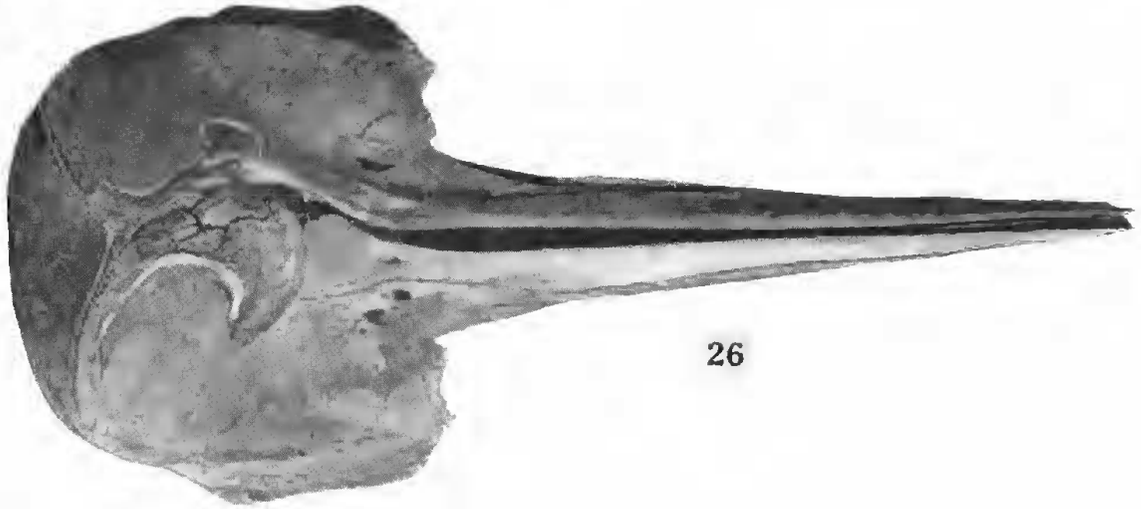
Mandible with rami separate. Teeth with denticle pointing outwards and upwards (fig. 25). Dimensions of teeth:

	Right.	Left.
Length of base - - -	52 mm.	54 mm.
Greatest depth - - -	29	29
Greatest width - - -	9	9·5

The teeth of Waite's male from Kingston (15 feet 3 inches in length) are similar to those of the example from Port Victoria, but in the latter specimen the denticle is down-bent. In this younger Victor Harbour male the teeth

resemble closely those of a specimen 14 feet in length, described and figured by Turner (1).

Loc. Victor Harbour, South Australia. (Skull in South Australian Museum, Reg. No. M. 2969.)



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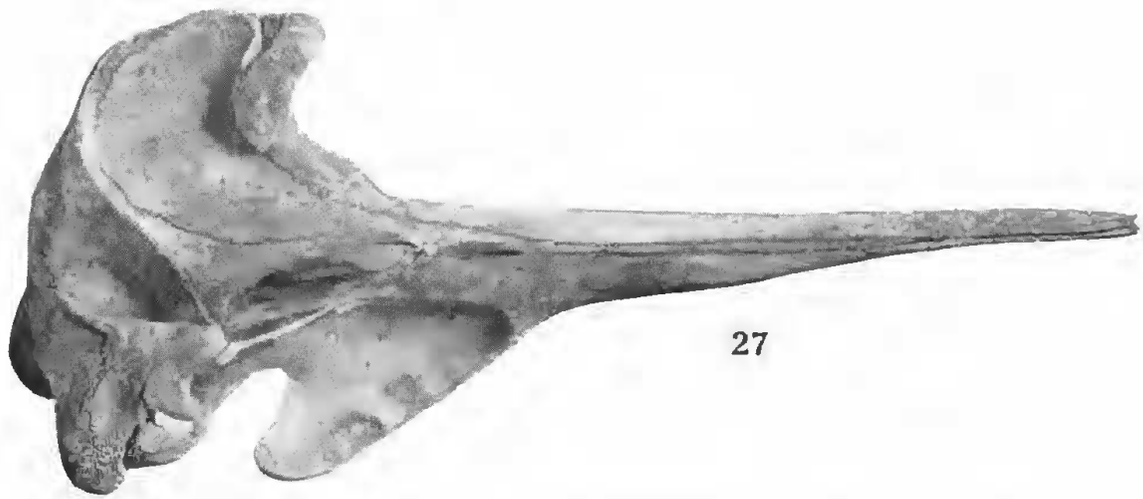

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Figs. 26-27. *Mesoplodon layardii*: dorsal and lateral views of skull of male from Victor Harbour.

Dimensions of Skulls of Mesoplodon layardii.

	Pt. Victoria. Sex ?.	Victor Harbor. Male.
Total length - - - - - - - - - -	910 mm.	800 mm.
Height from vertex to inferior border of pterygoids -	332	331
Tip of rostrum to level of antorbital notches - -	575	500
Tip of rostrum to posterior border of pterygoids - -	730	640

(1) Turner, "Challenger" Report, i, 1880, p. 10, pl. ii, figs. 15-16.

	Pt. Victoria, Sex ?.	Victor Harbour, Male.
Greatest depth of rostrum	81	70
Breadth between orbits	356	343
Breadth between antorbital "tubercles"	256	241
Breadth of premaxillae in front of nares	153	148
Greatest breadth of anterior nares	50	55
Length of tympanic bulla	43–44	43–45
Breadth of tympanic bulla	33	30
Height of supraoccipital (dorsal edge of foramen magnum to top of occipital crest)	200	220
Width of foramen magnum	58	52
Width of condyles	135	132
Height of condyles	77	74
Length of mandible	738	681
Greatest depth of mandible	116	116
Length of symphysis	200	182

Descriptions of persons who saw the two whales cavorting near the rocky coast of Victor Harbour suggest that the animals were mating, and in their excitement became fouled by rocks, both examples exhibiting extensive cuts.

Sexual activities may account for some otherwise unaccountable strandings. In September, 1903, five Blackfish (*Globiocephala melaena*) were stranded at St. Kilda, in St. Vincent Gulf, about twenty miles north of Adelaide, under the following circumstances. Mr. Temby, a fisherman, "was scared by the groaning of some animal in the mangrove swamp." The creature proved to be a female Blackfish in difficulties in the mud of the swamp. Mr. Temby then noticed four other individuals swimming in shallow water nearby, and apparently loth to leave the female. When the tide felt these four, all males, were also left high and dry. The skeletons of three of the males and of the female are in the South Australian Museum.